نموذج (هـ)

Summarized Course Description

Course number: ECE 200	Course name: Academic and professional communication for Engineering
لغة تدريس المقرر: English	Pre-requisites: ENG 104
Credit hours: 3 (3-1-0)	Course level: Level 4/Year 2

Course Description وصف المقرر :

The first part of the program is to train students to write a 1500 word source based report on a topic in their field of study. They should develop skills such as APA style of documentation, advanced internet search and library research skills. The second part of the program is to enable Students to the world of work starting with the job hunt (job applications, cover letters, resumes, interviews) and leading to the most important aspects of business correspondence(letter formats, style, tone, inquiry, special request and complaint). The third part of the program is to Instruct on advanced presentation skills for public speaking in both academic and professional environments.

Course objectives أهداف المقرر :

The course aims at developing the various communication skills through a series of tasks such as classroom activities, and home assignments that encourage engineering students to combine their knowledge of English with their technical knowledge needed in their future careers for a good professional conduct.

Course Outcomes مخرجات التعليم:

Upon completing the course, the student should be able to:

1. The students should be able to create technical report as per the requirements and demands.
2. The students should have fluency to correspond in different situations such as job applications, cover letters, resumes, inquiry etc…
3. The students should have confidence to face job interviews, customer presentations and group discussions.
4. The students should be articulate enough in academic and professional environments.

الكتاب المقرر والمراجع المساندة:
Textbook and references

Successful Writing at Work by Philip C. Kolin, 4th ed., 2015

نموذج (هـ)

Summarized Course Description

Course number: ECE 210	Course name: Electric Circuits (1)
English :لغة تدريس المقرر	Pre-requisites: MATH205 & PHYS103
Credit hours: 3 (2+ 2+ 0)	Course level: Level 4 /Year2

Course Description وصف المقرر :

Circuit elements, Basic laws: Ohm's, KVL, KCL, and Power calculations. Resistive circuits: voltage and current divider rules, Dependent sources. Circuit analysis techniques: Nodal and Mesh analysis. Network theorems: Thevenin's Norton's, Source transformation, Superposition, Maximum power transfer. Energy storage elements: definitions and voltage-current relationships. Responses of first order LR and LC circuits. Responses of second order circuits. Phasor steady-state sinusoidal circuits analysis.

Course objectives أهداف المقرر :

1. Apply basic laws: Ohms law, KVL, KCL and power calculations.
2. Analyze resistive networks' and simplify complicated networks.
3. Use different circuit analysis techniques.
4. Deal with circuit containing energy storage elements.
5. Determine transient and steady state responses of first order circuits .
6. Perform Phasor frequency domain analysis.

Course Outcomes مخرجات التعليم:

Upon completing the course, the student should be able to:

1. Apply knowledge of mathematics, science, and engineering to the analysis and design of electrical circuits.
2. Identify, formulate, and solve engineering problems in the area circuits and systems.
3. Design an electric system, components or process to meet desired needs within realistic constraints.

Textbook and references الكتاب المقرر والمراجع المساندة:

Book	Authors	Publisher	Publication year
Electric Circuits	James Nilsson and Susan Riedel	Pearson	2014
Fundamentals of Electric Circuits	Charles K. Alexander, Matthew N. O. Sadiku	McGraw Hill	2016
Introductory Circuit Analysis	Robert Boylesta	Pearson	2016

نموذج (هـ)

Summarized Course Description

Course number: ECE 260	Course name: Digital Logic Circuit Design
English :لغة تدريس المقرر	Pre-requisites: MATH 103T
Credit hours: 4 (**3-2-0**)	Course level: Level - 5

Course Description **وصف المقرر :**

Number systems & codes. Logic gates. Boolean algebra. Karnaugh maps. Analysis and synthesis of combinational systems. Decoders, multiplexers, adders and subtractors, PLA's. Types of flip-flops. Memory concept. Counters. Registers. Sequential circuit design. System level digital design. HDL (Verilog) use in the design and synthesis of digital systems. Field-programmable gate arrays (FPGAs).

Course objectives **أهداف المقرر :**

1. Introduce digital principle with emphasis on logic design.
2. Familiarize the students with necessary mathematical tools such as number systems, codes, and Boolean algebra .
3. Present the principle of analysis and design of computational logic circuits.
4. Present the principle of analysis and design of sequential logic circuits.

Course Outcomes **مخرجات التعليم:**

Upon completing the course, the students will be able to:

1. Understand basic terminology, types of logic gates (AND, OR, NOT, NAND, NOR, XOR)
2. Perform the basic operations used in computers and other digital systems.
3. Apply basic rules of Boolean algebra, De Morgan's laws
4. Utilize the universality of NAND and NOR gates for implementing logic functions.
5. Use Karnaugh maps for circuit minimization.
6. Analyze and design computational logic circuits.
7. Analyze and design sequential logic circuits.
8. Ability to use CAD tools to simulate and verify logic circuits.

Textbook and references **الكتاب المقرر والمراجع المساندة:**

Text Book: Digital design by M Morris Mano & Michael D. Ciletti, 5th edition (or later), Pearson; 5 edition (January 9, 2012), ISBN-13: 978-0132774208
ISBN-10: 0132774208

References:

Alan B. Marcovitz, Introduction to Logic Design, third edition, McGraw Hill, 2010
John F. Wakerly, Digital Design:Principles and Practices Package, fifth Edition, Pearson Education, 2017

نموذج (هـ)

Summarized Course Description

Course number: ECE 211	Course name: Electric Circuits (2)
English :لغة تدريس المقرر	Pre-requisites: ECE 210
Credit hours: 3 (2+ 2 + 0)	Course level: Level - 5 Year3

Course Description وصف المقرر :

Three-phase circuits and power calculation, linear op-amp and op-amp circuits, transient and steady state response of the first-order and the second-order circuits, Laplace transform and solution of circuits in complex-frequency domain, frequency response of passive circuits, transfer functions, poles and zeros, resonance networks, and filters, two-Port networks, mutually-coupled coils and the ideal transformer.

Course objectives أهداف المقرر :

- Understand and analyze AC power generation and consumption
- Design power factor correction and power matching circuits.
- Understand and analyze three phase electrical systems.
- Understand and analyze transformers.
- Identify, characterize, and design RLC Filters.
- Characterize and analyze two-port electrical networks

Course Outcomes مخرجات التعليم:

Upon completing the course, the student should be able to:

1. An ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical circuits**.**
2. An ability to apply knowledge of mathematics, science, and engineering to the design of electrical circuits
3. An ability to identify, formulates, and solves basic electrical engineering problems.
4. An ability to use the techniques, skills, and modern engineering tools such as Multisim to analysis and design electrical circuits**.**
5. An ability to conduct experiments, as well as to analyze and interpret data.

Textbook and references الكتاب المقرر والمراجع المساندة:

Book	Authors	Publisher	Publication year
Electric Circuits	James Nilsson and Susan Riedel	Pearson	2014
Fundamentals of Electric Circuits	Charles K. Alexander, Matthew N. O. Sadiku	McGraw Hill	2016
Introductory Circuit Analysis	Robert Boylestad	Pearson	2016

نموذج (هـ)

Summarized Course Description

Course number: ECE 202	Course name: Engineering Mathematics
English :لغة تدريس المقرر	Pre-requisites: MATH221T
Credit hours: 3 (3+ 0+ 0)	Course level: Level 5 Year 3

Course Description وصف المقرر :

Special functions. Bessel's functions and Legendre polynomials. Vector analysis including vector fields, divergence, curl, line and surface integrals, Green's, Gauss' and Stokes' theorems. Sturm-Liouville theory. Complex Numbers, Functions of a complex variable, differential complex calculus. Complex integration, Cauchy's theorem. Complex series, Taylor and Laurent series. Residue theorem. Introduction to partial differential equations and boundary value problems in rectangular, cylindrical and spherical coordinates.

Course objectives أهداف المقرر :

To develop and enhance the student's ability to solve engineering problems using mathematical tools

Course Outcomes مخرجات التعليم:

Upon completing the course, the student should be able to:

1. Apply knowledge of a vector field and its differentiation (divergence and curl) and boundary value problem as applied to electrical systems.
2. Explain and discuss the theorem of Green, Stokes, Divergence, Sturm-Liouville, Cauchy Integral and Residue.
3. Clarify complex calculus and partial differential equations and their applications in Electrical Engineering field
4. Interpret heat and wave equations appropriate for electrical engineering

Textbook and references الكتاب المقرر والمراجع المساندة:

Book	Authors	Publisher	Publication year
Advanced Modern Engineering Mathematics	Glyn James	Prentice Hall	2011
Advanced Engineering Mathematics	Erwin Kreyszig	Wiley	2011
Engineering Mathematics with Examples and Applications	Xin-She Yang	Academic Press	2017

نموذج (هـ)

Summarized Course Description

Course number: ECE 240	Course name: Semiconductor Devices
لغة تدريس المقرر: English	Pre-requisites: PHYS103
Credit hours: 3 (3-**0**-**0**)	Course level: Level - 5

Course Description وصف المقرر :

Principal classes of semiconductor devices in modern microelectronics and photonics. Charge carrier statistics and transport, luminescence, photoconductivity, p-n junctions, metal- semiconductor junctions, diodes, field-effect transistor (MOSFET), bipolar junction transistor (BJT), photodiodes, Light-emitting diodes (LED), laser diodes (LD).

Course objectives أهداف المقرر :

1. Explain the basic theory and operation of semiconductor devices used for integrated circuit applications.
2. Describe the techniques used in optimizing semiconductor device design. Provide the students with a basic understanding of forming the most important semiconductor devices in modern microelectronics and photonics.

Course Outcomes مخرجات التعليم:

Upon completing the course, the student should be able to:

1. Understand electronic structure, charge carrier statistics, and transport properties in semiconductors
2. Realize the different fabrication technology for semiconductor devices and integrated circuits
3. Explain charge transport in p-n junctions and metal-semiconductor contacts
4. Apply the principles of field effect (MOSFET) and bipolar junction (BJT) transistors
5. Apply the principles of light-emitting diodes (LED) and laser diodes (LD), photoconductors/photodiodes, and photovoltaic solar cells.

Textbook and references الكتاب المقرر والمراجع المساندة:

Text Book: B.G. Streetman and Sanjay Banerjee: Solid State Electronic Devices, 6th edition (or later), Prentice Hall, 2006.

References:

Muller, Richard S., Theodore I. Kamins, and Mansun Chan. Device Electronics for Integrated Circuits. 3rd ed. New York, NY: John Wiley & Sons, 2002. ISBN: 9780471593980.

D.A. Neamen, “Semiconductor Physics and Devices”, McGraw-Hill, 4th, 2011,

Holger T. Grahn, “Introduction to Semiconductor Physics”, World Scientific, 1st, 1999.

G. Parker, "Introductory Semiconductor Device Physics", Prentice Hall, 1994

Kanaan Kano, "Semiconductor Devices", Prentice Hall, 1998

نموذج (هـ)

Summarized Course Description

Course number: ECE 241	Course name: Electronics (1)
لغة تدريس المقرر: English	Pre-requisites: ECE 211
Credit hours: 4 (3-2-0)	Course level: Level - 6

Course Description وصف المقرر :

Opamp Linear Applications. PN junction and zener diodes. Diode Models. Diode basic circuit analysis and diode applications (e.g. rectifier and limiters). MOSFET and BJT (Mode of operation, Terminal characteristics, DC biasing, small signal analysis). Amplifier configurations and characteristics. CMOS digital circuits.

Course objectives أهداف المقرر :

1. Introduce the op-amps and its basic applications.
2. Present different types of diodes and its main applications.
3. Introduce different types of transistors, their modes of operations, and DC biasing techniques.
4. Apply knowledge of mathematical models to design single transistor amplifiers.
5. Be familiar with different digital families and get the required knowledge to design CMOS logic gates.

Course Outcomes مخرجات التعليم:

Upon completing the course, the student should be able to:

1. Analyze and design different circuits using ideal op-amps.
2. Identify and characterize different semiconductor devices (P-N Junction, BJT, MOSFET, and JFET).
3. Understand different diode and transistor applications (clipping, clamping, amplifier, digital gates ...).
4. Analyze and design different electronic circuits contain semiconductor devices using devices' models.
5. Identify the design parameters and different characteristics of small signal amplifiers.
6. Understand different digital families and get the required knowledge to select the proper family for a certain application.
7. Use the techniques, skills, and modern engineering tools such as PSPICE to analysis and design electronic circuits.
8. Conduct electronics experiments including analysis and interpretation of measured results.

Textbook and references الكتاب المقرر والمراجع المساندة:

Text Book: Sedra and Smith, “Microelectronic Circuit,” 7th Edition (or later), 2014, Oxford University Press, ISBN 9780199339136.

References:

Richard Jaeger, and Travis Blalock, Microelectronic Circuit Design, 5th Ed., McGraw Hill Education, 2016. SBN: 0073529605.

Mark N. Horenstein, Microelectronic Circuit and Devices (2nd Edition) (Part A & B), Pearson, 1994, ISBN 10: 0137013353 ISBN 13: 9780137013357

نموذج (هـ)

Brief Course Description

Course number: ECE 220	Course name: Electromagnetics
لغة تدريس المقرر: English	Pre-requisites: ECE 210, ECE 202
Credit hours: 4 (3+ 2+ 0)	Course level: Level 6- Third Year

Course Description — وصف المقرر :

Course description:
Review of vector algebra and vector Calculus. Electrostatics: Coulomb's law, Gauss's law, electric potential, Poisson's and Laplace's equation, image method, resistance and capacitance. Magnetostatics: Biot-Savart law, Ampere's law, Magnetic forces, magnetic boundary conditions and inductance.

Course objectives — أهداف المقرر :

- ✓ To introduce the basic concepts of electric charge and magnetism.
- ✓ To explain the concepts of the electrostatic field, the potential difference, and Gauss law.
- ✓ To allow students learn the principals of the static magnetism and its laws.
- ✓ To link the electric circuits elements to electromagnetism.

Course Outcomes — مخرجات التعليم:

Upon completing the course, the student should be able to:

- Use vector algebra and vector calculus in electromagnetism.
- Describe and explain the basic concepts of electricity and magnetism such as charge, potential and field.
- Understand Gauss' law, Ampere's Law, Biot-Savart law and their applications.
- Carry out experiments, analyze the obtained data and compare with theoretical results.

Textbook and references — الكتاب المقرر والمراجع المساندة:

Book	Authors	Publisher	Publication year
Elements of Electromagnetics (textbook)	M. Sadiku	Oxford University Press	2015
Engineering Electromagnetics	W.H. Hayt, and J. A. Buck	McGraw-Hill	2007
Fundamentals of Applied Electromagnetics	F. T. Ulaby and U. Ravaioli	Pearson	2015

نموذج (هـ) –

مختصر توصيف المقرر

اسم المقرر: Introduction to Engineering Design	رقم المقرر ورمزه: ECE 203
المتطلب السابق: MATH 103T	لغة تدريس المقرر: English
مستوى المقرر: Year 3-Level 6	الساعات المعتمدة: 2(0-2-1)

وصف المقرر: Module Description

This course is a sophomore level design course that introduces the basic elements of engineering design with emphasis on teamwork and communication skills. It exposes students to engineering profession, jobs and disciplines. Topics include problem-solving procedure: from problem definition, needs identification, literature review, concept generation, generation of alternatives, selection methodology to solution implementation, and assessment of implementation. Reverse engineering and engineering code of ethics with impact of engineering solutions on society is also discussed. This course gives practice in open-ended problems, critical and lateral thinking, planning and scheduling through design project plus organization of the work and design documentation. It enables students to consider safety, legal, environmental and human factors, and other societal constraints in execution of their design projects.

أهداف المقرر: Module Aims

The course aims to introduce the engineering design process, the tools and the techniques used for product development or services applied to many engineering disciplines like industrial, mechanical, electrical and computer. This course provides opportunities for students to develop oral and written communication skills and work effectively in teams. It gives students opportunity to practice elements of active learning and demonstrate skills in the engineering design process in completing a design project.

مخرجات التعليم: (الفهم والمعرفة والمهارات الذهنية والعملية)

يفترض بالطالبة بعد دراستها لهذا المقرر أن تكون قادرة على:

Take personal responsibility for learning as of how to search and collect information and rearrange it for a given topic.	
Use skills in teamwork including team norms and use effective teams discussion tools such as team agenda, minutes and team process check	
Explain problem definition techniques and problem solving strategies	
Explain quality, customer expectations, and process	
Explain planning components such as Gantt chart, deployment chart and critical path	
Discuss ethical issues, safety considerations, and environmental, social and cultural impact pertaining to the project.	
Present technical work in an organized way using modern techniques such as book keeping (Design Notebook), using checklist, etc.	
Present professional behaviour in the areas of	

punctuality, time management, meeting deadlines, and professional appearance appropriate of engineering professionals	
Develop written and oral communication skills while networking with faculty and students.	

الكتاب المقرر والمراجع المساندة:

سنة النشر	اسم الناشر	اسم المؤلف	اسم الكتاب
2001	McGraw Hill	Arvid Eide , Roland Jenison Larry Northup , Lane Mashaw	**Introduction To Engineering Design and Problem Solving**
2007	Prentice Hall	Fogler, H.S., LeBlanc, S., E	**Strategies for Creative Problem Solving**
2013	Cengage	John R. Karsnitz, Stephen O'Brien , John P. Hutchinson	**Engineering Design: An Introduction**
2009	Great Lake Press	W.C. Oakes, L.L. Leone, and C.J. Gunn	**Engineering Your Future: A Comprehensive Approach**

Topics to be covered **الموضوعات التي سيتم تناولها:**

List of topics	**No. of Weeks**
What engineering do? Engineering disciplines and their systems	1
Learning Culture	1
Introduction to Engineering Design Process and design team	2
Creative Problem Solving	2
Generation of alternative concepts, evaluation of alternatives and selection of a concept. Design defense and performance evaluation and design report	3
Engineering The Profession and Communication	2
Architecture and physical function decomposition; human factor, environment, and safety issues in design;	1
Autonomous Learner, time management and study skills	1
Engineering codes of ethics and impact of solution on society	1

نموذج (هـ)

Brief Course Description

Course number: ECE 270	Course name: Signals and Systems
لغة تدريس المقرر: English	Pre-requisites: ECE 210
Credit hours: 3 (3+ 0 + 0)	Course level: Level 6 - Third Year

Course Description وصف المقرر :

Representation and properties of continuous time signals. Linear time-invariant systems and convolution. Fourier series. Fourier transform and applications. Sampling theorem. Laplace transform. Transfer functions. Time domain analysis of discrete linear systems and z-transform. The discrete Fourier transform.

Course objectives أهداف المقرر :

- ✓ To familiarize the students with the fundamental concepts of continuous and discrete signals and systems and their properties.
- ✓ To explain the notion of linear time-invariant systems and convolution.
- ✓ To explain the different transform-domain techniques and their applications
- ✓ To acquire skills to simulate and implement basic signal analysis.

Course Outcomes مخرجات التعليم:

Upon completing the course, the student should be able to:

- Understand the characterization of both continuous- and discrete-time signals and systems.
- Identify LTI systems and carry out convolution operation.
- Understand and manipulate the different transform-domain techniques and their applications.
- Simulate signals and systems using Software tools such as Matlab.

Textbook and references الكتاب المقرر والمراجع المساندة:

Book	Authors	Publisher	Publication year
Signals, Systems and Transforms (textbook)	Charles L. Phillips, John M. Parr, Eve A. Riskin	Pearson	2014
Signals and systems	Alan V. Oppenheim, Alan S. Willsky, with. S. Hamid	Prentice-Hall	1997
Signals and Systems: Continuous and Discrete	Rodger E. Ziemer, William H Tranter, D. R. Fannin	Pearson	1998
Signals and Systems Using MATLAB	Luis F. Chaparro	Academic Press	2010

نموذج (هـ)

Course Description Summary

Course number: ECE 371	Course name: Communications Systems
لغة تدريس المقرر: English	Pre-requisites: ECE 270
Credit hours: 4 (3+2+0)	Course level: Seventh Level- Fourth Year

Course Description وصف المقرر :

Review of Fourier series and Fourier transform Amplitude modulation. Phase and frequency modulation. Sampling and quantization, Pulse code modulation, Line coding and spectra, Signaling over band-limited channels and inter-symbol interference, Digital modulation schemes. Introduction to current and emerging communication systems

Course objectives أهداف المقرر :

- ✓ To introduce basic communication systems and their signal flow diagrams.
- ✓ To enable describing AM and FM modulation schemes in both time and frequency domains and design basic AM and FM systems.
- ✓ To enable grasping the analog-to-digital conversion and line coding.
- ✓ To introduce digital modulation schemes and their applications.

Course Outcomes مخرجات التعليم:

Upon completing the course, the student should be able to:

- Derive and describe the frequency spectrum of different types of radio signals.
- Identify, analyze, compare, and implement amplitude and frequency modulation schemes.
- Understand sampling and analog to digital conversion.
- Identify and implement basic digital modulation schemes.

Textbook and references الكتاب المقرر والمراجع المساندة:

Book	Authors	Publisher	Publication year
Modern Digital and Analog Communication Systems (textbook)	Lathi B. P.	Oxford University Press	2018 5th Edition
Digital and Analog Communication Systems	Couch L. W.	Prentice-Hall	2013
Communication Systems Engineering	Proakis J. G. and Salehi M.	Prentice-Hall	2002
Digital Communications: Fundamentals and Applications	Sklar B.	Prentice-Hall	2009

نموذج (هـ)

Summarized Course Description

Course number: ECE 330	Course name: Control Systems
English : لغة تدريس المقرر	Pre-requisites: ECE 270
Credit hours: 3 (3+ 0 + 0)	Course level: Level 7 - Fourth Year

Course Description وصف المقرر :

Introduction to control systems. Representation of physical control system elements. Transfer functions, Signal flow graphs. State space analysis. Sensitivity, static accuracy and transient response. Stability of control systems : Routh criterion, Root locus, Frequency response methods, Nyquist stability criterion. Compensation techniques. Introduction to digital control and the Z transform. Discrete time control system.

Course objectives أهداف المقرر :

Students will be able to:

- Develop mathematical models for linear dynamic systems in continuous and discrete time
- Use time domain and frequency domain tools to analyze and predict the behavior of linear systems.
- Use time domain and frequency domain techniques to design feedback compensators to achieve a specified performance criterion.
- Use MATLAB for system analysis and design.

Course Outcomes مخرجات التعليم:

On successful completion of this course, the students will have developed

- knowledge and understanding of
  - i) essence of using feedback and structure of feedback systems
  - ii) basic principles of control system analysis in the time-domain
  - iii) basic principles of control system analysis in the frequency-domain
- their skills in:
  - i) evaluating transient and steady-state responses of control systems
  - ii) designing basic controllers
- their appreciation of and respect for values and attitudes regarding the issues of:
  - i) feedback
  - ii) reliability and economy in control system design

Textbook and references الكتاب المقرر والمراجع المساندة:

Book	Authors	Publisher	Publication year
Modern Control Systems, 13th edition.	Richard C. Dorf and Robert H. Bishop	Pearson	2017
Automatic Control Systems, 9th edition	FARID GOLNARAGHI, BENJAMIN C. KUO	JOHN WILEY & SONS, INC.	2010
Feedback Control of Dynamic Systems 8th Edition	Gene F. Franklin J. David Powell, Abbas Emami-Naeini	Pearson	2019

نموذج (هـ)

Summarized Course Description

Course number: ECE 342	Course name: Electronics (2)
لغة تدريس المقرر: English	Pre-requisites: ECE 241
Credit hours: 4 (**3-2-0**)	Course level: Level - 7

Course Description وصف المقرر :

Differential amplifiers. Multistage amplifiers. Amplifier frequency response (for single stage, multistage and opamp). Feedback: Circuit topologies and analysis. Active filters single and multi-opamp topologies, inductance simulation. Stability and pole locations, Opamp based Sinusoidal Oscillators, transistors based Sinusoidal Oscillators. Introduction to A/D and D/A.

Course objectives أهداف المقرر :

1. Consider the operations and characteristics of differential amplifier BJT and MOSFET.
2. Study frequency response of amplifiers.
3. Presents several useful multistage amplifiers.
4. Introduce the main electronics circuit building blocks: amplifiers, filters and oscillators.
5. Apply advanced analysis methodologies: pole-zero calculations, s-domain, and feedback.
6. Provide basics of data convertors.

Course Outcomes مخرجات التعليم:

Upon completing the course, the student should be able to:

1. Apply knowledge of mathematics, science, and engineering to the analysis of electronic circuits (Amplifiers Active Filters, and Oscillators).
2. Use the techniques, skills, and modern engineering tools such as PSPICE to analysis and design electronic circuits.
3. Apply knowledge of mathematics, science, and engineering to the design of electronic circuits (such as Amplifiers, Active Filters, and Oscillators).
4. Identify, formulates, and solves electronic engineering problems.
5. Design a electronic components or process to meet desired needs within realistic constraints such as economic, environmental, social political, ethical, health and safety, manufacturability and sustainability.
6. Use the techniques, skills, and modern engineering tools such as PSPICE to analysis and design electronic circuits.

Textbook and references الكتاب المقرر والمراجع المساندة:

Text Book: Sedra and Smith, “Microelectronic Circuit,” 7th Edition (or later), 2014, Oxford University Press, ISBN 9780199339136.

References:

Richard Jaeger, and Travis Blalock, Microelectronic Circuit Design, 5th Ed., McGraw Hill Education, 2016. SBN: 0073529605.

Mark N. Horenstein, Microelectronic Circuit and Devices (2nd Edition) (Part A & B), Pearson, 1994, ISBN 10: 0137013353 ISBN 13: 9780137013357.

نموذج (هـ)

Summarized Course Description

Course number: ECE 343	Course name: Introduction to Digital VLSI
لغة تدريس المقرر: English	Pre-requisites: ECE 241
Credit hours: 4 (**3-2-0**)	Course level: Level - 7

Course Description وصف المقرر :

Theory and practice of very-large-scale integration (VLSI) circuit design. Metal-oxide-semiconductor (MOS) transistors; static and dynamic complementary metal-oxide-semiconductor (CMOS) combinational and sequential circuits; design of adders, multipliers, and shifters; performance, power consumption and testing. CAD tools for layout, timing analysis, synthesis, physical design, and verification.

Course objectives أهداف المقرر :

1. Have an understanding of the characteristics of CMOS circuit construction.
2. Introduce the concepts and techniques of modern integrated circuit design and testing (CMOS VLSI).
3. Provide experience designing integrated circuits using Computer Aided Design (CAD) Tools.

Course Outcomes مخرجات التعليم:

Upon completing the course, the student should be able to:

1. Create models of moderately sized CMOS circuits that realize specified digital functions.
2. Apply CMOS technology-specific layout rules in the placement and routing of transistors and interconnect, and to verify the functionality, timing, power, and parasitic effects.
3. Compare between different state-of-the-art CMOS technologies and processes.
4. To give the student an understanding of the different design steps required to carry out a complete digital VLSI (Very-Large-Scale Integration) design in silicon.
5. Design functional units including adders, multipliers, ROMs, SRAMs, and PLAs

Textbook and references الكتاب المقرر والمراجع المساندة:

Textbook: N. Weste and D. Harris, CMOS VLSI Design: A Circuits and Systems Perspective (4th Edition), 2010. AddisonWesley.

References: Jan M. Rabaey, Anantha Chandrakasan, and Borivoje Nikolic, Digital Integrated Circuits: A Design Perspective, 2nd Edition, Prentice Hall, ISBN: 0-13-090996-3, 2003. • S.M. Kang and Y. Leblebici, CMOS Digital Integrated Circuits: Analysis and Design (3rd edition), McGraw Hill, ISBN 0-07-246053-9, 2003.

نموذج (هـ)

Summarized Course Description

Course number: ECE 344	Course name: Introduction to Nanoelectronics
لغة تدريس المقرر: English	Pre-requisites: ECE 242
Credit hours: 3 **(3-0-0)**	Course level: Level - 8

Course Description — وصف المقرر :

Theory of current, voltage and resistance from atoms up. Electrons at the nanoscale. Principles of quantum mechanics, including quantization, the wave-particle duality, wavefunctions and Schrödinger's equation. Electronic properties of molecules, carbon nanotubes and crystals, including energy band formation and the origin of metals, insulators and semiconductors. Electron conduction. Ballistic transport. Derivation of Ohm's law. Ballistic vs bulk MOSFETs.

Course objectives — أهداف المقرر :

1. Understand the basic principles that govern the operation and electrical characteristics of nanoelectronic devices.
2. Become familiar with the recent research being undertaken in nanoelectronics.
3. Examine the basic ideas and concepts required to understand current flow in nanodevices.

Course Outcomes — مخرجات التعليم:

Upon completing the course, the student should be able to:

4. Clearly explain distinct phenomena that are important in nanoelectronic devices.
5. Describe the operating principles, merits, demerits and challenges of some of the futuristic nanoelectronic devices.
6. Compute a given parameter or physical quantity for a nanoelectronic device by applying appropriate equations or formula.
7. Describe the challenges of scaling of conventional MOSFETs and possible solutions.
8. Calculate information regarding the energy levels of structures used in nanodevices.

Textbook and references — الكتاب المقرر والمراجع المساندة:

Text Book: Vladimir V. Mitin, Viatcheslav A. Kochelap and Michael A. Stroscio Frontmatter, Introduction to Nanoelectronics: Science, Nanotechnology, Engineering, and Applications, Cambridge textbooks, March 2012, isbn: 9781107403765

References:

M. Lundstrom and J. Guo, Nanoscale Transistors: Physics, Modeling, and Simulation, Springer 2006.

S. Datta, Quantum Transport: Atom to Transistor. Cambridge University Press 2005

Y. Tsividis, The MOS Transistor. Oxford University Press, 2nd edition 1999

R. Feynman, Lectures on Computation. Editors A.J.G. Hey and R.W. Allen, Addison-Wesley 1996.

نموذج (هـ)

Summarized Course Description

Course number: ECE 350	Course name: Optical Electronics
لغة تدريس المقرر: English	Pre-requisites: ECE 240,ECE 241
Credit hours: 4 (**3-2-0**)	Course level: Level - 8

Course Description : وصف المقرر

Fundamentals of optical signals and modern optical devices and systems. Photovoltaic solar cells. Optical systems sources (e.g., lasers and light-emitting diodes), light modulation components (e.g., liquid-crystal light modulators), transmission media (e.g., free space or fibers), photodetectors (e.g., photodiodes, photomultiplier tubes), information storage devices (e.g., optical disk), processing systems (e.g., imaging and spatial filtering systems) and displays (LCOS microdisplays).

Course objectives : أهداف المقرر

1. Introduce the student to the generation, propagation, and detection of optical electromagnetic waves.
2. Gain a fundamental understanding of the basic physics and technology of quantum electronics devices and laser systems.

Course Outcomes : مخرجات التعليم

Upon completing the course, the student should be able to:

1. Predict optical output intensity and efficiency of a continuous wave laser.
2. Explain the differences and similarities between lasers based on transitions between discrete atomic or molecular levels, and semiconductor lasers. 27.
3. Explain the principles of gain and absorption in highly doped homojunction laser diodes operating with high-levels of injection current.
4. Use the concepts of densities of states, quasi-Fermi levels, Fermi distributions and simple semiconductor energy band theory to compute gain vs frequency as a function of injection current in a homojunction laser.
5. Design a simple diode laser having given performance specifications.

Textbook and references : الكتاب المقرر والمراجع المساندة

Text Book: J. T. VERDEYEN, LASER ELECTRONICS, 3RD ED., PRENTICE-HALL.

REFERENCES

Saleh, B., and M. Teich. *Fundamentals of Photonics*. New York, NY: Wiley, 1991. ISBN: 0471839655.

R. Feynman, Lectures on Computation. Editors A.J.G. Hey and R.W. Allen, Addison-Wesley 1996

نموذج (هـ)

Summarized Course Description

Course number: ECE 331	Course name: Energy System
English :لغة تدريس المقرر	Pre-requisites: ECE 211
Credit hours: 3 (3+ 0 + 0)	Course level: Level 8 - Year 4

Course Description وصف المقرر :

conventional and renewable energy sources and their environmental consequences; overview of power systems structure-generation, transmission, and distribution- and its changing landscape; review of phasors and three-phase electric circuits; fundamental principles in magnetic theory; principle and structure of transformers; principles of electromechanical energy conversion; theory and operation of induction machines; synchronous generators and motors; theory and operation of dc motor.

Course objectives أهداف المقرر :

- understand basic concepts of electrical machines and transmission lines
- will learn how to start and operate an electrical machine;
- learn the details of construction of different types of electrical machines;
- learn how to analyze the performance and design the components
- learn how to perform experimentation with electrical machines

Course Outcomes مخرجات التعليم:

Upon completing the course, the student should be able to:

1. Understand of the power systems and its changing landscape.
2. Know the sources of energy and the environmental consequences.
3. review the fundamental principals in magnetic theory that are essential in learning about power system apparatus.
4. Learn about transformers and the role they play in power systems.
5. Learn about AC machines and the role they play in power systems.
6. Understand the principles and application of DC motors.

Textbook and references الكتاب المقرر والمراجع المساندة:

Book	Authors	Publisher	Publication year
Principles of Electric Machines and Power Electronics	P.C. Sen,	John Wiley	2016
Electric Machines & drives	Ned Mohan	John Wiley	2012
Fundamentals of Electric Machinery	Chapman	McGraw Hill	2012

نموذج (هـ)

Summarized Course Description

Course number: ISE 305	Course name: Engineering Economy
English :لغة تدريس المقرر	Pre-requisites:
Credit hours: 3 (3+ 0 + 0)	Course level: Level 8 - Year 4

Course Description وصف المقرر :

Introduction to concepts of economic decision-making from a cash flow viewpoint. It includes present worth analysis, cash flow equivalence, rates of return, replacement analysis, benefit-cost analysis, depreciation and taxes, and projects break-even point, selection, and sensitivity analysis.

Course objectives أهداف المقرر :

- Develop students' awareness of the concepts of cash flow approach, time value of money, product/project costing and rate of return.
- Introduce students to the process of integrating engineering proposals with economic analysis in order to select among several viable alternative projects.
- Understand and appreciate the models and measures used in decision making in the area of engineering economics.

Course Outcomes مخرجات التعليم:

Upon completing the course, the student should be able to:

1. Evaluate the economic feasibility of investments related to engineering projects.
2. Assess the impact of depreciation, taxation and other economic factors on projects' feasibility.
3. Conduct sensitivity analysis on key compounding parameters.
4. Develop policies for assets replacement.
5. Assess alternative financing modes.
6. Make financially prudent decisions in everyday life (car/home loans or investments).

Textbook and references الكتاب المقرر والمراجع المساندة:

Book	Authors	Publisher	Publication year
Fundamentals of Engineering Economics, 3rd Ed.	Park, Chan S.	Prentice Hall	2013
Engineering Economy and the Decision-making Process	Joseph C. Hartman	Pearson/Prentice Hall	2007
Engineering Economy	Leland Blank and Anthony Tarquin	McGraw-Hill	2012

Weekly breakdown of course topics

Week	Topic
1-4	Engineering economic decisions Cash Flows, Time Value of money & money management
5-6	Present and Future worth, annual equivalence analysis and Payback Period
7-8	Rate of return analysis
9	Bond Problems
10-11	Comparison of alternatives & replacement decisions
12-13	Depreciation
14	Corporate income tax Inflation and its impact on project cash flows
15	Economic analysis in the public sector (Benefit-Cost Analysis) Project break-even and sensitivity analysis

نموذج (هـ)

Summarized Course Description

Course number: ECE 390	Course name: Summer Training
English :لغة تدريس المقرر	Pre-requisites: The student must pass at least 125 credits
Credit hours: 1	Course level:

Course Description وصف المقرر :

A continuous period of 8 weeks of summer training spent in the industry working in any of the fields of electrical engineering. The training should be carried out in an organization with an interest in one or more of these fields. On completion of the program, the student is required to submit a formal written report of his work.

Course objectives أهداف المقرر :

- Enable the students to link theory and practice and to gain valuable practical/field experience.
- Provide guidance for future career opportunities.
- Familiarize the students with the work environment after graduation.
- Develop the student's work ethics.
- Develop the student's communication skills.
- Develop the ME student's teamwork skills.
- Enhance the relationship between the Electrical Engineering Department and industry.

Course Outcomes مخرجات التعليم:

Upon completing the course, the student should be able to:

1. Understand the company organization, services, products and goals.
2. Understand the role of their departments and the contribution of their groups to the company's operation.
3. Identify, formulate, and solve engineering problems.
4. Practice the use of technology tools in designing and implementing electrical systems on practice.
5. Deliver and present their work experience and any projects effectively through written and oral communication.
6. Recognize the importance of self learning and development.
7. Follow work regulations.

Textbook and references الكتاب المقرر والمراجع المساندة:

Book	Authors	Publisher	Publication year

نموذج (هـ)

Summarized Course Description

Course number: ECE 449	Course name: Microelectromechanical Devices
لغة تدريس المقرر: English	Pre-requisites: ECE 344
Credit hours: 3 (3-0-**0**)	Course level: Level – 9 or 10

Course Description وصف المقرر :

Introduction to microsystem design, material properties, microfabrication technologies, structural behavior, sensing methods, fluid flow, microscale transport, noise, and amplifiers feedback systems. Design of microsystems (sensors, actuators, and sensing/control systems) of a variety of types, (e.g., optical MEMS, bioMEMS, inertial sensors) (e.g., sensitivity, signal-to-noise) using a realistic microfabrication process. Modeling and simulation in the design process. Design and Fabrication of practical MEMS examples.

Course objectives أهداف المقرر :

1. Explore the world of microelectromechanical devices and systems ("MEMS").
2. Provide fundamental of related material properties, fabrication technologies,
3. Presents basic structural mechanics, sensing and actuation principles, circuit and system issues, packaging, calibration, and testing.

Course Outcomes مخرجات التعليم:

On successful completion this course, the student should be able to:

1. Identify the relative importance of different physical phenomena based on length scale
2. Identify and describe the most commonly used fabrication processes in making MEMS devices
3. For a simple MEMS device, identify the major required fabrication steps and put them in the appropriate order (create a process flow)
4. Use the principles of elastic theory in predicting the stress/strain state of MEMS devices
5. List a number of common MEMS transducers and explain their operating principles
6. Explain in detail the operating principles of a piezoresistive MEMS pressure sensor, and predict the performance of such a device
7. Give a well-formed argument considering a microtechnology-based solution for a given problem.
8. Gain experience using English in spoken and written forms as a means of expressing technical ideas
9. Visualize structures created with microfabrication process sequences, creation of low-order dynamical device models.
10. Insert of learned models into the simulation of a complete electronic measurement circuit.

Textbook and references الكتاب المقرر والمراجع المساندة:

Text Book: Senturia, Stephen D. *Microsystem Design*. New York, NY: Springer, 2004. ISBN: 9780792372462.

References:

Kovacs, Gregory T. A. *Micromachined Transducers Sourcebook*. New York, NY: McGraw-Hill, 1998. ISBN: 9780072907223.

Maluf, Nadim. *An Introduction to Microelectromechanical Systems Engineering*. Boston, MA: Artech House, 1999. ISBN: 9780890065815.

Nathan, Arokia, and Henry Baltes. *Microtransducer CAD: Physical and Computational Aspects*. New York, NY: Springer, 1999. ISBN: 9783211831038

نموذج (هـ)

Summarized Course Description

Course number: ECE 445	Course name: Analog Integrated Circuits
لغة تدريس المقرر: English	Pre-requisites: ECE 341
Credit hours: 3 (**3-0-0**)	Course level: Level – 9 or 10

Course Description وصف المقرر :

Practice of integrated circuit design. Discrete vs Integrated circuits. Classes of chip design, chip partitioning, and architecture; Mixed mode integrated circuit devices and concepts. Advanced modeling and 2nd order effects of transistors and single stage amplifiers. Current mirrors and sources. Voltage and current references.
Design of transconductance amplifier. Design of input stages, differential pairs, active loads, gain stages and level shifting. Output stages, power dissipation. Analysis and design of typical opamp circuits.

Course objectives أهداف المقرر :

1. Analysis, design, and applications of modern analog circuits using integrated field effect transistor technologies.
2. Introduce the principles of analog circuits and apply the techniques for the design of analog integrated circuit (Analog IC's).

Course Outcomes مخرجات التعليم:

On successful completion this course, the student should be able to:

1. Describe the models for active devices in MOS and Bipolar IC technologies,
2. Describe layout considerations for active and passive devices in analog ICs,
3. Analyze and design single-ended and differential IC amplifiers,
4. Analyze and design IC current sources and voltage references,
5. Describe the noise sources and models applicable to ICs,
6. Analyze integrated circuit noise performance,
7. Analyze and design IC operational amplifiers,
8. Describe the operation of commonly used data conversion circuits, and
9. Design, simulate, lay out, and verify analog integrated circuit designs using a commercial CAD environment.

Textbook and references الكتاب المقرر والمراجع المساندة:

Text Book:

Razavi, Design of Analog CMOS Integrated Circuits, McGraw-Hill, 2016 2nd addition, ISBN 9780072524932

References:

P. Gray, P. Hurst, S. Lewis, R. Meyer, Analysis and Design of Analog Integrated Circuits by (More BJT) Wiley, 2009 5th addition.
Willy Sansen, Analog Design Essentials, Springer, 2006 1st addition.
Boylestad and Nashelsky, Electronic Devices and Circuit Theory, Pearson Highered 2012 11th addition.

نموذج (هـ)

Summarized Course Description

Course number: ECE 446	Course name: Industrial Electronics
لغة تدريس المقرر: English	Pre-requisites: ECE 341
Credit hours: 4 (**3-2-0**)	Course level: Level – 9 or 10

Course Description وصف المقرر :

Introduction to measurements systems and basic definitions. Sensors (temperature, humidity, light, piezoelectric , hall effect, pressure, flow and strain gauges) and, signal conditioning circuits (bridge, instrumentation amplifier, scaling circuits, comparators, A/D and D/A, 555 timer). Remote control. Ultrasound systems. Measurements techniques (temperature and humidity measurements, level and displacement measurement, pressure and flow measurement). Introduction to foundation field bus. 555 timers. Power switches (power transistors, SCR, Triac, UJT, PUT). Structure and application in power control. Instrumentation amplifier. Opto electronic sensors. LCD and 7 segment interface. Ultrasonic transistors and applications. Voltage regulators (series, shunt, 3 terminals, switched mode). Power inverter and its applications. Introduction to microcontroller industrial applications.

Course objectives أهداف المقرر :

1. Introduce the principles of measurement and sensing.
2. Presents different types of conditioning circuits needed in industrial applications.
3. Introduce power electronics components.
4. Design of industrial applications using commercially available components.

Course Outcomes مخرجات التعليم:

On successful completion this course, the student should be able to:

1. Use the 555 Timer and its applications.
2. Utilize Power semiconductor devices, Thyristors (SCR, Diacs, Triacs, UJT).
3. Be familiar with some examples of industrial electronic circuits
4. Use sensors (Temperature sensors, Pressure sensors, etc.)
5. Design Instrumentation Amplifier, Comparators, Schimit Trigger.
6. Be familiar with Opto electronic sensors.
7. Design LCD and 7 segment interface.
8. Utilize ultrasonic transistors in related applications.
9. Design voltage regulators (series, shunt, 3 terminals, switched mode).
10. Understqand the operation of power inverter and its applications.
11. Be familiar with microcontroller industrial applications.

Textbook and references الكتاب المقرر والمراجع المساندة:

Text Book:

Timothy J. Maloney, Modern Industrial Electronics, Prentice Hall, 2004 5th edition. ISBN 13: 9780130156761, ISBN 10: 0130156760.

References:

Muhammad H. Rashid, Power Electronics: Circuits, Devices & Applications, Prentice Hall, 2014 4th edition, ISBN 978-0133125900.

J. Rehg, and G. Sartori, Industrial Electronics, Prentice Hall, 2006 1st edition.

Colin D. Simpson, Industrial Electronics, 1st edition, ISBN-13: 978-0024106223, ISBN-10: 0024106224

نموذج (هـ)

Summarized Course Description

Course number: ECE 447	Course name: Digital Integrated Circuits
لغة تدريس المقرر: English	Pre-requisites: ECE 343
Credit hours: 3 (**3-0-0**)	Course level: Level – 9 or 10

Course Description وصف المقرر :

MOS device models including Deep Sub-Micron effects; circuit design styles for logic, arithmetic and sequential blocks; estimation and minimization of energy consumption; interconnect models and parasitics; device sizing and logical effort; timing issues (clock skew and jitter) and active clock distribution techniques; memory architectures, testing of integrated circuits. Circuit layout and CAD tools.

Course objectives أهداف المقرر :

1. Introduce the basics of digital integrated circuits design.
2. Exercise the different issues related to the development of digital integrated circuits including fabrication, circuit design, implementation methodologies, testing, design methodologies and tools and future trends.

Course Outcomes مخرجات التعليم:

On successful completion this course, the student should be able to:

1. Understand CMOS circuits and systems that are suitable for CMOS fabrication.
2. Apply the models for state-of-the-art VLSI components, fabrication steps, hierarchical design flow.
3. Design simulated experiments using CAD verify the integrity of a CMOS circuit and its layout.
4. Practice the design aspects involved in the realization of CMOS integrated circuits/systems from device up to the subsystem level.

Textbook and references الكتاب المقرر والمراجع المساندة:

Text Book: Sung-Mo (Steve) Kang, Yusuf Leblebici, and Chul Woo Kim. CMOS Digital Integrated Circuits Analysis & Design, 4th edition, McGraw Hill, 2014

Reference Text: Jan M. Rabaey, Anantha Chandrakasan, and Borivoje Nikolic. Digital Integrated Circuits, A Design Perspective, 2nd edition, Prentice Hall, 2003. ISBN: 0130909963

Palnitkar, Samir. *Verilog HDL: A Guide to Digital Design and Synthesis.* 2nd ed. Upper Saddle River, NJ: Prentice Hall, 2003. ISBN: 0130449113.

Jan M. Rabaey, Anantha Chandrakasan, and Borivoje Nikolic, Digital Integrated Circuits: A Design Perspective, 2nd Edition, Prentice Hall, ISBN: 0-13-090996-3, 2003.

نموذج (هـ)

Summarized Course Description

Course number: ECE 448	Course name: **Nanotechnology**
لغة تدريس المقرر: English	Pre-requisites: ECE 344
Credit hours: 4 (**3-2-0**)	Course level: Level – 9 or 10

Course Description وصف المقرر :

Techniques and applications of nanofabrication and miniaturization of devices to the smallest scale. The technology of miniaturization, its fundamentals and present trends towards building devices and structures on the nanometer scale. Examples of applications of nanotechnology in the electronics, communications, data storage and sensing world will be described, and the underlying physics as well as limitations of the present technology will be discussed.

Course objectives أهداف المقرر :

1. Learn some of the basics of nanofabrication and nanocharacterization techniques as well as specific applications of nanotechnology in commercial products.
2. Understand fundamental physical scaling laws applied to understanding the properties of materials at the nanometer scale.
3. Introduce self assembly, surfaces and interfaces in nanotechnology.

Course Outcomes مخرجات التعليم:

On successful completion this course, the student should be able to:

1. Describe the basic science behind the properties of materials at the nanometer scale.
2. Familiar with the principles behind advanced experimental and computational techniques for studying nanomaterials.
3. Communicate clearly, precisely and effectively using nanotechnology scientific language and mathematical notation.
4. Systematically solve scientific problems related specifically to Nano technological materials using conventional scientific and mathematical notation.
5. Identify computational characterization of nanomaterials.

Textbook and references الكتاب المقرر والمراجع المساندة:

Text Book: John C. Morrison, Modern Physics for Scientists and Engineers, Elsevier, 2nd Edition, 2015, ISBN 978-0-12-800734-1.

References:

- Solid State Electronic Devices; B. G. Streetman, S. Banerjee; Prentice-Hall, 5th ed.
- Physics of Semiconductor Devices; Jean-Pierre Colinge, Springer 2002.

نموذج (هـ)

Summarized Course Description

Course number: ECE 451	Course name: Solar cells
لغة تدريس المقرر: English	Pre-requisites: ECE 350
Credit hours: 4 (**3-2-0**)	Course level: Level – 9 or 10

Course Description وصف المقرر :

Advanced semiconductor devices as a new source of energy for the 21st century. Delivering electricity directly from sunlight. The suitable semiconductor materials. Device physics. Fabrication technologies for solar cells. The cost aspects, market development. Application areas of solar cells. Application of design of a complete solar cell system for household application.

Course objectives أهداف المقرر :

1. Learn about the principles of the photovoltaic conversion.
2. Explain the advantages and limitations of different solar cell technologies, such as crystalline silicon solar cell technology and thin film solar cell technologies.
3. Present an understanding of the specifications of solar modules and know how to design a complete solar system for a particular application.

Course Outcomes مخرجات التعليم:

On successful completion this course, the student should be able to:

1. Explain the principles that underlie the ability of various natural phenomena to deliver solar energy

2. Outline the technologies that are used to harness the power of solar energy

3. Discuss the positive and negative aspects of solar energy in relation to natural and human aspects of the environment.

4. Acquainted with solar cell foundimentals: why we need solar energy, how solar cells produce power, and how they work.

5. Be familiar mono- and multi-crystalline solar cells, thin film solar cells, and new emerging technologies.

Textbook and references الكتاب المقرر والمراجع المساندة:

Text Book: Wenham, S. R., M. A. Green, M. E. Watt, R. Corkish. Applied Photovoltaics. 2nd .ed. New York, NY: Earthscan Publications Ltd., 2007. ISBN: 9781844074013.

References:

Poortmans, J., and V. Arkhipov. Thin Film Solar Cells: Fabrication, Characterization and Applications. Hoboken, NJ: John Wiley & Sons, 2006. ISBN: 9780470091265.
Green, M. A. Third Generation Photovoltaics: Advanced Solar Energy Conversion. New York, NY: Springer-Verlag, 2007. ISBN: 9783540265627.
Ruud E. I. Schropp, Miro Zeman, Amorphous and microcrystalline silicon solar cells: modeling, materials, and device technology, Volume 5 of Electronic Materials Series, Publisher: Springer, 1998, ISBN 9780792383178
Online book: Honsberg, C., and S. Bowden. Photovoltaics: Devices, Systems and Applications

نموذج (هـ)

Summarized Course Description

Course number: ECE 452	Course name: Fundamentals of Photovoltaics
لغة تدريس المقرر: English	Pre-requisites: ECE 350
Credit hours: 3 (**3-0-0**)	Course level: Level – 9 or 10

Course Description وصف المقرر :

Fundamentals of photoelectric conversion: charge excitation, conduction, separation, and collection. Lectures cover commercial and emerging photovoltaic technologies and cross-cutting themes, including conversion efficiencies, loss mechanisms, characterization, manufacturing, systems, reliability, life-cycle analysis, risk analysis, and technology evolution in the context of markets, policies, society, and environment.

Course objectives أهداف المقرر :

1. Show how solar cells are manufactured.
2. Introduce how solar cells are evaluated, what technologies are currently on the market.
3. Discuss the risk and potential of existing and emerging solar cell technologies.

Course Outcomes مخرجات التعليم:

On successful completion this course, the student should be able to:

1. Explain how solar cells convert light into electricity.
2. Examine the potential and drawbacks of currently manufactured technologies (single- and multi-crystalline silicon, micromorph tandem cells, CdTe, CIGS, CPV, PVT).
3. Examine pre-commercial technologies (organics, biomimetic, organic/inorganic hybrid, and nanostructure-based solar cells).
4. Apply Hands-on laboratory to explore how a solar cell works in practice.
5. Scrutinize what limits solar cell performance and cost, and the major hurdles technological, economic, and political towards widespread substitution of fossil fuels.
6. Apply acquired knowledge towards developing and critiquing a solar energy technology prospectus.

Textbook and references الكتاب المقرر والمراجع المساندة:

Text Book: Wenham, S. R., M. A. Green, M. E. Watt, R. Corkish. Applied Photovoltaics. 2nd .ed. New York, NY: Earthscan Publications Ltd., 2007. ISBN: 9781844074013.

References:

Poortmans, J., and V. Arkhipov. Thin Film Solar Cells: Fabrication, Characterization and Applications. Hoboken, NJ: John Wiley & Sons, 2006. ISBN: 9780470091265.

Green, M. A. Third Generation Photovoltaics: Advanced Solar Energy Conversion. New York, NY: Springer-Verlag, 2007. ISBN: 9783540265627.

Luque, A., and S. Hegedus. Handbook of Photovoltaic Science and Engineering. Hoboken, NJ: John Wiley & Sons, 2003. ISBN: 9780471491965.

Deutsche Gesellschaft für Sonnenenergie, *Planning and installing photovoltaic systems: a guide for installers, architects and engineers*, Edition 2, Publisher: Earthscan, 2008, ISBN 9781844074426

نموذج (هـ)

Summarized Course Description

Course number: ECE 461	Course name: Digital System Design
لغة تدريس المقرر: English	Pre-requisites: ECE 343
Credit hours: 3 (**3-0-0**)	Course level: Level – 9 or 10

Course Description وصف المقرر :

Design of systems using PLDs and ASICs (in particular, gate arrays and standard cells). Design and implementation details of various systems and logic device technologies. Practical aspects of ASIC design, such as timing, testing, and fault grading. Topics include synchronous design, state machine design, ALU and CPU design, application-specific parallel computer design, design for testability, PALs, FPGAs, VHDL, standard cells, timing analysis, fault vectors, and fault grading.

Course objectives أهداف المقرر :

1. Introduce the concepts and design techniques of Very Large Scale Integration systems through a study of Application Specific Integrated Circuits (ASICs) with particular emphasis on Field Programmable Gate Arrays (FPGAs).

2. Discuss fully custom, standard cell, gate array and programmable ASICs and the influence of total cost on choice of ASIC type.

3. Explore Programmable Logic Devices (PLDs), Field Programmable Gate Arrays (FPGAs). Programming technology. CMOS logic cells. Coarse-grained vs fine-grained architectures. Routing and Timing. I/O cells. Embedded microprocessors.

4. Introduce ASIC Design Software, design flows and design entry methods: Schematic Entry, Hardware Description Languages (HDLs): VHDL.

5. Discuss behavioural and structural models. Event-driven simulation. Logic Synthesis: limitations of HDL based logic synthesis.

Course Outcomes مخرجات التعليم:

On successful completion this course, the student should be able to:

1. Know about the different types of ASIC available and their suitability for different applications.

2. Understand the principles of Programmable ASIC technology.

3. Understand the principles of ASIC design.

4. Describe architecture of FPGAs and their logic and I/O cells. Shows knowledge of timing limitations.

5. Demonstrate understanding of the basic physics of CMOS logic cells. Can build simple logic functions from standard cells.

6. Describe Register Transfer Level (RTL) design: datapath, High Level State Machines (HSM), operator binding, operator scheduling, area-time trade-offs.

7. Perform timing analysis of simple circuits, using reasonable approximations

based on underlying physics.

8. Explain the need for behavioural and structural models for the same circuit. Can perform “dry runs” of VHDL simulations. Can devise simple RTL designs.

9. Describe the limitations and pitfalls of HDL-based logic synthesis and design. Can perform “dry runs” of VHDL simulations showing correct use of Delta Time. Can evaluate alternative RTL designs.

Textbook and references الكتاب المقرر والمراجع المساندة:

Text Book: N. Weste and D. Harris, CMOS VLSI Design: A Circuits and Systems Perspective (4th Edition), 2010. Addison Wesley.

Reference Textbooks:

S.M. Kang and Y. Leblebici, CMOS Digital Integrated Circuits: Analysis and Design (3rd edition), McGraw Hill, ISBN 0-07-246053-9, 2003.

Smith, Douglas. *HDL Chip Design*. Madison, AL: Doone Publishing, 2001. ISBN: 0965193438.

A great book for the intermediate Verilog designer. Clearly outlines the relationship between Verilog models and the corresponding synthesized circuit.

Smith, Michael. *Application-Specific Integrated Circuits*. Reading, MA: Addison Wesley, 1997. ISBN: 0201500221.

A useful reference on many of the lower-level details about synthesis, place and route, and FPGA mapping.

Sweetman, Dominic. *See MIPS Run*. San Francisco, CA: Morgan Kaufman, 1999. ISBN: 1558604103.

نموذج (هـ)

Summarized Course Description

Course number: ECE 462	Course name: Computer Systems Architecture
English :لغة تدريس المقرر	Pre-requisites: ECE 343
Credit hours: 4 (**3-2-0**)	Course level:

Course Description وصف المقرر :

Computer system organization and design, implementation of CPU datapath and control, instruction set design, memory hierarchy (caches, main memory, virtual memory) organization and management, input/output subsystems (bus structures, interrupts, DMA), performance evaluation, pipelined processors.

Course objectives أهداف المقرر :

1. Study of the evolution of computer architecture and the factors influencing the design of hardware and software elements of computer systems
2. Understanding Structure and Function of Digital Computer at 3 Levels: Assembly/machine language level: instruction set, System architecture level: subsystems & connections and digital logic level: gates, memory elements, buses.

Course Outcomes مخرجات التعليم:

Upon completing the course, the student should be able to:

1. Demonstrate the fundamentals of hardware and software technologies that underlie contemporary computer-based information systems
2. Establish strong knowledge about underlying structure and theories of computers and programming.
3. Develop algorithms for programming solutions and write simple programs.
4. Identify the basic elements of hardware and explain their functions and how they fit together to form an architecture.
5. Explain how data is represented, manipulated and stored within a computer system.
6. Identify and explain the functions of operating systems.
7. Explain how computers interact through local and wide area networks.
8. Identify various different types of programming languages.
9. Explain common data types and structures.

Textbook and references الكتاب المقرر والمراجع المساندة:

Textbook: Hennessy, J. L., and D. A. Patterson. Computer Architecture: A Quantitative Approach, 3rd ed. San Mateo, CA: Morgan Kaufman, 2002. ISBN: 1558605967.

References:

Hennessy, J. L., and D. A. Patterson. Computer Architecture: A Quantitative Approach, 2nd ed. San Mateo, CA: Morgan Kaufman, 1995. ISBN: 1558603727.

Patterson, D. A., and J. L. Hennessy. Computer Organization and Design: The Hardware/Software Interface, 3rd ed. San Mateo, CA: Morgan Kaufman, 2004. ISBN: 1558606041.

نموذج (هـ)

Summarized Course Description

Course number: ECE 491	Course name: Electrical Engineering Seminar
English :لغة تدريس المقرر	Pre-requisites: The student must pass at least 125 credits
Credit hours: 1 (0+ 0 + 2)	Course level: Level 9 - Fifth Year

Course Description وصف المقرر :

This course provides a forum for students to discuss and generate ideas on issues related to their field of study. Students conduct an in-depth study of a research topic of their choice, discuss issues with experts in the field of research, work in discussion groups, debate and problem solve on selected issues. In the seminar, the students are given an opportunity to integrate their knowledge, skills and practical experience gained in the program.

Course objectives أهداف المقرر :

This course seeks to:

1. Provide students with the opportunity to improve critical thinking skills by writing and orally defending a persuasive research paper in which arguments counter to the stated position are addressed.
2. Provide students with the opportunity to improve oral communication skills by giving two formal oral presentations.
3. Provide students with the opportunity to develop skills in writing to a general audience as opposed to writing to a specific audience as typically occurs in courses for the major.
4. Provide students with the opportunity to strengthen information literacy skills in order to be able to recognize when information is needed and to locate, evaluate, and use effectively the needed information.
5. Provide students with an opportunity to view their own disciplines, their intended careers, and their lives in the larger contexts of life-long learning.
6. Bring together students and faculty members from diverse academic fields to reflect on their college careers, to integrate what they have learned with the experiences of others.

مخرجات التعليم: الكتاب المقرر والمراجع

المساندة: Textbook and references

Book	Authors	Publisher	Publication year

نموذج (هـ)

مختصر توصيف المقرر

Course number: ISE 200	Course name: Statics
Language: English	Pre-requisites: MATH 103T + PHYS 102
Credit hours: 3 (3+ 1+ 0)	Course level: Level 3

وصف المقرر: **Course Description**

يقدم هذا المقرر المفاهيم الهندسية على أساس القوى في حالة التوازن. وتشمل المواضيع: أنظمة القوى: تحليل متجهات القوى، العزوم، عزم الازدواج في الأنظمة ذات الأبعاد الثنائية والثلاثية، توازن القوى، التحليل الإنشائي: الدعامات المستوية والهياكل، توزيع القوى: مراكز الأجسام والأشكال المركبة، عزوم القصور الذاتي للمساحات، الاحتكاك.	This course introduces the concepts of engineering based on forces in equilibrium. Topics include: Force systems; vector analysis of forces, moments and couples in 2 and 3 dimensions. Equilibrium of forces. Analysis of structures; plane trusses and frames. Distributed force system: centroids of simple and composite bodies. Area moments of inertia. Analysis of beams. Friction.

الموضوعات التي سيتم تناولها: **Topics to be covered**

قائمة الموضوعات	No. of lectures	List of topics
مقدمة	1	Introduction
أنظمة القوى	13	Force Systems: 2D and 3D
اتزان القوى	5	Equilibrium of forces
تحليل الدعامات والهياكل	8	Analysis of trusses and frames
توزيع القوى	6	Distribution of forces, centroids of regular and composite bodies
عزم القصور الذاتي للمساحات	6	Area moment of inertias
قوى القص والعزوم لدعامات بسيطة	4	Shear force and moment diagrams for simple determinate beams
الاحتكاك	2	Friction

أهداف المقرر: **Course Aims**

تتلخص أهداف هذا المقررفي ما يلي: 1) تمكين الطالبات من فهم ميكانيكية الأجسام في حالة السكون وتحليل القوى والمتجهات 2) تحديد مراكز الكتلة وعزم القصور الذاتي 3) تطبيق مبادئ الميكانيكا الأساسية لتحليل المنشآت الهندسية الثابتة.	The objectives of the course are to: 1) Enable students to understand statics of rigid bodies including vector analyses, forces 2) Determine centers of mass and moments of inertia 3) Apply of basic mechanics principles for the analysis of static engineering structures.

مخرجات التعليم: (الفهم والمعرفة والمهارات الذهنية والعملية)

يفترض بالطالبة بعد دراستها لهذا المقرر أن تكون قادرة على:

Apply the concepts of equilibrium to various structures.	تطبيق مفاهيم الاتزان على المنشآت المختلفة
Draw free-body diagrams of particles and rigid bodies.	رسم مخططات الجسم الحر للأجزاء والاجسام الصلبة.
Determine internal forces in structures and shear force and bending moment in beams.	تحديد القوى الداخلية في المنشآت وقوة القص وعزم الانحناء في الدعامات
Calculate centroid and moment of inertia of simple and complex shapes.	حساب مركز الثقل وعزم القصور الذاتي للأشكال البسيطة والمعقدة.

الكتاب المقرر والمراجع المساندة:

اسم الكتاب	اسم المؤلف	اسم الناشر	سنة النشر
Engineering Mechanics Volume 1 Statics 7^{th} edition	J.L. Meriam, L.G. Kraige	John Wiley & Sons, Inc.	2012
Engineering Mechanics: Statics, 12th Edition	Russell C. Hibbeler	Prentice Hall	2012

نموذج (هـ)

Summarized Course Description

Course number: ISE 201	Course name: Engineering Drawing
Language: English	Pre-requisites: ---
Credit hours: 3 (1+4 +0)	Course level: Level 4

Course Description وصف المقرر :

Introduction: Skills of freehand sketching. Methods of projection: orthographic, isometric. Dimensioning of views. Third view prediction. Primary and successive auxiliary views. Intersections of surfaces and bodies. Development of surfaces. Sectioning. Introduction to assembly drawings. Steel sections. Standards and conventions. Computer Aided Graphics using SOLIDWORK crafting package. Applications

Course objectives أهداف المقرر :

- This course is intended to cover theory and practical techniques of engineering drawing. The course teaches the use of Solidworks as a CAD tool in making engineering drawings.

Course Outcomes مخرجات التعليم:

Upon completing the course, the student should be able to:

1. Develop 3D solid models using modern engineering 3D software, through
   1.1 Using sketching commands and entities relationships,
   1.2 Using Extrude and Extrude Cut Commands,
   1.3 Using Revolve and Revolve Cut Commands,
   1.4 Using 3D sketch Commands,
   1.5 Using Sweep and Sweep Cut Commands,
   1.6 Using Loft and Loft Cut Commands,
   1.7 Using Assembly Commands to assemble several parts to create 3D assembled Models.
2. Use Drawing Sheet Commands to create:
   2.1 Orthographic and auxiliary views in 2D working drawings sheets.
   2.2 Section views in 2D working drawings sheets.
3. Conclude 3D models out of 2D models.
4. Use Sheet Metal Commands needed to develop sheet metals models.

Textbook and references **الكتاب المقرر والمراجع المساندة:**

Book	Authors	Publisher	Publication year
Students Manual, Solid Works notes, prepared			
Technical Drawing with Engineering Graphics,14th Edition	Frederick E. Giesecke	Pearson	2014
Solidworks tutorials,		Solidworks Help	

نـمـوذج (هـ)

Summarized Course Description

Course number: ECE 201	Course name: Programming Applications For Engineers
لغة تدريس المقرر: English	Pre-requisites: CS 110T
Credit hours: 3 (2+ 2+ 0)	Course level: Level - 5

Course Description : وصف المقرر

Fundamental principles, concepts and methods of programming (C and MATLAB), with emphasis on applications in the physical sciences and engineering. Basic problem solving and programming techniques; use of programming logic in solving engineering problems.

Course objectives : أهداف المقرر

1. Give students an introduction to the uses of computer languages in the analysis of contemporary scientific problems covering the basic syntax and structure with examples drawn from real applications.
2. Covers both conceptual areas of converting a problem to be solved into a computer-based solution, and specific aspects of individual languages and the types of problems they are best suited to solve.
3. Emphasis is placed on the importance of structure, documentation, major toolboxes and libraries, interfacing techniques and platform specific issues.

Course Outcomes : مخرجات التعليم

Upon completing the course, the student should be able to:

1. Demonstrate competency in the fundamental principles, concepts and methods of programming (C and MATLAB), with emphasis on developing solutions in the domains of physical sciences, mathematics, and engineering.
2. Demonstrate the ability to function as part of a technical team to generate the solution to a programming problem.
3. Explore common programming concepts in various computing environments and implement those concepts across more than one language.
4. Analyze alternative algorithm designs to implement a solution designed to make efficient use of limited resources of the computer.

Textbook and references الكتاب المقرر والمراجع المساندة:

Text Book:
Forouzan and Gilberg, Computer Science, A Structured Programming Approach Using C, 3rd ed.

References:
1. Problem Solving and Program Design in C, 8th edition, Jeri Hanly and Elliot Koffman, Prentice Hall, 2016.

2. The C Programming Language. 2nd ed. Kernighan, Brian, and Dennis Ritchie. Upper Saddle River, NJ: Prentice Hall, 1988. ISBN: 9780131103627.

3. Matlab, Fourth Edition: A Practical Introduction to Programming and Problem Solving, 4th Edition , Stormy Attaway, Todd Green, ISBN-13: 978-0128045251 ISBN-10: 0128045256.

نموذج (هـ) –

مختصر توصيف المقرر

اسم المقرر: Introduction to Engineering Design	رقم المقرر ورمزه: ECE 203
المتطلب السابق: MATH 103	لغة تدريس المقرر: English
مستوى المقرر: Year 3-Level 6	الساعات المعتمدة: (0+2+1)2

وصف المقرر: Module Description

This course is a sophomore level design course that introduces the basic elements of engineering design with emphasis on teamwork and communication skills. It exposes students to engineering profession, jobs and disciplines. Topics include problem-solving procedure: from problem definition, needs identification, literature review, concept generation, generation of alternatives, selection methodology to solution implementation, and assessment of implementation. Reverse engineering and engineering code of ethics with impact of engineering solutions on society is also discussed. This course gives scheduling practice in open-ended problems, critical and lateral thinking, planning and through design project plus organization of the work and design documentation. It enables students to consider safety, legal, environmental and human factors, and other societal constraints in execution of their design projects.

أهداف المقرر: Module Aims

The course aims to introduce the engineering design process, the tools and the techniques used for product development or services applied to many engineering disciplines like industrial, mechanical, electrical and computer. This course provides opportunities for students to develop oral and written communication skills and work effectively in teams. It gives students opportunity to practice elements of active learning and demonstrate skills in the engineering design process in completing a design project.

مخرجات التعليم: (الفهم والمعرفة والمهارات الذهنية والعملية)

يفترض بالطالبة بعد دراستها لهذا المقرر أن تكون قادرة على:

Take personal responsibility for learning as of how to search and collect information and rearrange it for a given topic.	
Use skills in teamwork including team norms and use effective teams discussion tools such as team agenda, minutes and team process check	
Explain problem definition techniques and problem solving strategies	
Explain quality, customer expectations, and process	
Explain planning components such as Gantt chart, deployment chart and critical path	
Discuss ethical issues, safety considerations, and environmental, social and cultural impact pertaining to the project.	
Present technical work in an organized way using modern techniques such as book keeping (Design Notebook), using checklist, etc.	
Present professional behaviour in the areas of punctuality, time management, meeting deadlines,	

and professional appearance appropriate of engineering professionals	
Develop written and oral communication skills while networking with faculty and students.	

الكتاب المقرر والمراجع المساندة:

سنة النشر	اسم الناشر	اسم المؤلف	اسم الكتاب
2001	McGraw Hill	Arvid Eide , Roland Jenison Larry Northup , Lane Mashaw	**Introduction To Engineering Design and Problem Solving**
2007	Prentice Hall	Fogler, H.S., LeBlanc, S., E	**Strategies for Creative Problem Solving**
2013	Cengage	John R. Karsnitz, Stephen O'Brien , John P. Hutchinson	**Engineering Design: An Introduction**
2009	Great Lake Press	W.C. Oakes, L.L. Leone, and C.J. Gunn	**Engineering Your Future: A Comprehensive Approach**

Topics to be covered **الموضوعات التي سيتم تناولها:**

List of topics	No. of Weeks	قائمة الموضوعات
What engineering do? Engineering disciplines and their systems	1	
Learning Culture	1	
Introduction to Engineering Design Process and design team	2	
Creative Problem Solving	2	
Generation of alternative concepts, evaluation of alternatives and selection of a concept. Design defense and performance evaluation and design report	3	
Engineering The Profession and Communication	2	
Architecture and physical function decomposition; human factor, environment, and safety issues in design;	1	
Autonomous Learner, time management and study skills	1	
Engineering codes of ethics and impact of solution on society	1	

نموذج (هـ)

Summarized Course Description

Course number: ECE 492- 493	Course name: Capstone Design Course Sequence
English :لغة تدريس المقرر	Pre-requisites: GEN 202, Senior Standing
Credit hours: 2 (**1+2+0**) (each)	Course level: Level 9 & 10

Course Description **وصف المقرر :**

A two-semester course sequence that integrates various components of the curriculum in a comprehensive engineering design experience. Design of a complete project including establishment of objectives and criteria, formulation of design problem statements, preparation of engineering designs. The design may involve experimentation, realization and/or computer project. Team design projects, where appropriate, are highly encouraged.

Course objectives **أهداف المقرر :**

An integral part of the education provided to undergraduates in engineering is a senior two-semester course sequence in "capstone" design. The objectives of the sequence are to:

1. Require application of the knowledge gained in earlier courses to the design process.
2. Familiarize the student with the engineering design process: Definition, Synthesis, Analysis and Implementation.
3. Improve communication skills.
4. Promote organizational skills.
5. Stress importance of other influences on design such as economics, reliability, performance, safety, ethics and social impacts.
6. Simulate the postgraduate job environment.

Course Outcomes **مخرجات التعليم:**

After completing the courses students will able to:

1. Design a system or process to meet specifications with engineering constraints.
2. Function as a member of an engineering team.
3. Utilize technical resources both from prior coursework, as well as from other relevant sources.
4. Demonstrate excellent written and oral communication skills related to design project results.
5. Demonstrate an understanding of ethical and professional issues as well

as engineering standards related to their projects.

6. Demonstrate an understanding of contemporary issues as related to their projects.

Textbook and references **الكتاب المقرر والمراجع المساندة:**

Text Book: R. M. Ford and C. S. Coulston, Design for Electrical and Computer Engineers - Theory, Concepts and Practice, New York: McGraw-Hill, 2008 (Recommended Reference)
ISBN-10: 0132774208

References:

H.F. Hoffman, The Engineering Capstone Course: Fundamentals for Students and Instructors, DOI 10.1007/978-3-319-05897-9_2, © Springer International Publishing Switzerland 2014

نموذج (هـ)

مختصر توصيف المقرر

Course number: ISE 406	Course name: Engineering Management
Language: English	Pre-requisites: ISE 305
Credit hours: 3 (3+ 0 + 0)	Course level: Level 10

وصف المقرر: Module Description

This course is a general course designed to teach engineers the basic management skills they will need to be effective throughout their careers. It covers organization structure and the role of engineers in management of organizations. The management process, management and planning strategies, managerial functions related to production, inventory and human resources. Topics cover the basic elements of project planning and control including process of project management, strategic and intermediate term planning, organizing, leadership, motivation, finance, budgeting and operations management. Case studies pertaining to engineering problems will be utilized

أهداف المقرر: Module Aims

This course aims to equip engineers with key management principles and skills, they will need. The skills and knowledge covered in this course include necessary exposure to common engineering management topics such as planning, organizational structure and design, project and financial management and control, leadership, motivation, ethics and professionalism and the role an engineer can play in managing an organization. It also aims to expose students to qualitative tools to manage organizations and give them a chance to work in teams and give oral presentations and write a report.

مخرجات التعليم: (الفهم والمعرفة والمهارات الذهنية والعملية)

يفترض بالطالبة بعد دراستها لهذا المقرر أن تكون قادرة على:

Define the basic principles of management as applicable to engineering problems	
Apply appropriate management techniques for managing contemporary organizations using different case studies	
Use the techniques, skills, and modern engineering tools necessary for basic engineering management practices	
Apply qualitative tools and techniques to manage organizations like surveys, research, voting and other methods to draw conclusions and make decisions.	
Use appropriate project management tools like MS Project	
Communicate effectively in written/oral presentation	
Work effectively in teams	

الكتاب المقرر والمراجع المساندة:

سنة النشر	اسم الناشر	اسم المؤلف	اسم الكتاب
2014	Cengage Learning	Chuck Williams	MGMT
2016	Pearson	Jay Heizer and Barry Render	Principles of Operation Management

الموضوعات التي سيتم تناولها: **Topics to be covered**

List of topics	No. of Weeks	قائمة الموضوعات
Introduction to engineering and management	1	
Historical development of engineering management	1	
Forms of business and organizations	1	
Planning & forecasting and decision making	2	
Designing Adoptive organization	2	
Motivating and leading technical people	2	
Project Management	2	
Ethics & Social responsibility	1	
Financial control	2	